

Residential Hardwired Lighting

Statewide Codes & Standards Program

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Objectives & Rationale

- Improve clarity and enforceability of residential lighting requirements
- Improve energy efficiency of residential lighting (single and multifamily)
- Recognize increased quality & availability of compact fluorescent luminaires

Issue: High Efficacy Luminaire

■ How it is now:

- Luminaires with lamp efficacy ≥ 40 lumens/watt
- No medium base sockets, separate switches from incandescents

■ Proposed

- Same intent
- Hi efficacy lamp:
 $<15\text{W}$, $\geq 40 \text{ lm/W}$
 $15\text{W}-40\text{W}$, $\geq 50 \text{ lm/W}$
 $\geq 41\text{W}$, $\geq 60 \text{ lm/W}$
- Initial lumens, based on lamp watts only
- Line voltage, no med. base sockets

Issue: Bathroom Trade-off

■ How it is now:

- Bathrooms must have at least one hi-eff luminaire
- Else - Install hi-eff in garage, util or laundry, and Outdoor lighting with hi-eff or motion
- Ditto for each bath.

■ Proposed:

- No trade-off

Issue: Bathroom Lighting

■ How it is now:

- Def: any room with a shower or tub
- At least one hi-eff luminaire, switched from entry

■ Proposed

- Def: any room with shower, tub, toilet or sink for personal hygiene
- All lights hi efficacy
- Incandescents only if occupancy sensor with “manual on”

Issue: Utility, Laundry, Garage

■ How it is now:

- Only need high efficacy when doing trade-off for bath high efficacy reqmt.
- Only one room per bathroom traded-off

■ Proposed

- Lights in these rooms must be high efficacy
- Incandescents only if occupancy sensor with “manual on”
- (same as bathroom, not instead of)

Issue: Outdoor Lighting

■ How it is now:

- High eff. only when trade-off for bath high efficacy reqmt.
- Outdoor lighting permanently mounted to bldg
- High efficacy lamps or motion sensor

■ Proposed

- Must always do
- Outdoor lighting permanently mounted to bldg.
- High efficacy lamps or motion sensor/ photocontrol combo
- Except water features

Issue: Kitchen Lighting

■ How it is now:

- “General lighting” must be hi efficacy
- Sufficient & uniform
- Switched at entry
- If one fixture, it’s “general”

■ Proposed

- All kitchen fixtures must be high efficacy
- Exception:
up to 50% of watts if controlled by separate switches

Issue: Track, recessed, pendant

■ How it is now:

- No efficacy requirements for track, recessed or pendant outside of specific rooms

■ Proposed

- These must be high efficacy throughout the home
- Exception: unless controlled by dimmer switch

Recessed Luminaires

■ How it is now:

- If insulated ceiling must be IC rated

■ Proposed

- Ditto, plus
- Must be air tight (< 2.0 cfm per test)
- Must caulk or gasket at ceiling

Benefit/Cost for Hi Efficacy

B/C ratio high efficacy	Kitchen / Dining	Yard	Utility	Living	Garage	Hallway	Den	Bathroom	Bedroom
min	2.9	4.7	2.2	2.2	2.0	1.9	1.7	1.7	
mean	21.9	16.4	15.8	17.1	13.4	14.9	13.6	16.4	1
max	76.2	47.8	58.3	58.3	51.5	49.3	44.8	44.8	3

Note: Minimums exclude 3 lighting upgrades that have zero additional first cost.

Cost Effective (>1.0) for all locations

More so in high usage areas

Benefit/Cost for ICAT Fixtures

	Base	ICAT	Reduction	Units	ICAT
Effective Leakage	1.600	0.084	1.516	sq in	Increment
IUA	1.680	0.089	1.591	Btu/hr-deg F	\$ 4.12
City	CTZ	IDD (ASHRAE 119)	Energy savings per fixture (therms/yr)	30 Year Cost Savings PV\$ per fixture	B/C Ratio
San Diego	7	1,128	0.552	\$6.98	1.7
Los Angeles	6	1,698	0.831	\$10.51	2.6
Bakersfield	13	2,600	1.273	\$16.09	3.9
Santa Maria	5	2,801	1.372	\$17.34	4.2
Oakland	3	2,943	1.441	\$18.22	4.4
Fresno	13	3,101	1.518	\$19.19	4.7
Red Bluff	11	3,795	1.858	\$23.49	5.7
Mt Shasta	16	5,801	2.841	\$35.91	8.7

Cost Effective (>1.0) for all locations

Incremental costs are small